AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended) A non-volatile storage device comprising:

a plurality of banks; and

a control unit,

wherein each~~the~~ bank has a non-volatile memory unit and a buffer unit corresponding thereto,

the non-volatile memory unit of each bank can carry out an access operation independently, and

the control unit is adapted~~can be caused~~ to control, separately from each other, a first access processing between an outside of the non-volatile storage device and one of the buffer units~~unit~~ and a second access processing between at least one~~the~~ non-volatile memory unit and the corresponding buffer unit, based upon receipt of a directive~~directives~~ from the outside ~~separately from each other~~,

the first access processing performing~~including~~ an access to one buffer unit, and

the second access processing selectably performing one of~~including~~ an access to one non-volatile memory unit and an access to a plurality of non-volatile memory units ~~and capable of being caused to select either of the accesses~~.

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2. (original) The non-volatile storage device of claim 1, wherein the directive of the first access processing serves to write data input from the outside to the one buffer unit or to read data from the one buffer unit to the outside.

3. (original) The non-volatile storage device of claim 2, wherein the directive for writing or the directive for reading is given by a change in one or a plurality of control signals input from the outside.

4. (original) The non-volatile storage device of claim 3, wherein said non-volatile storage device can output, to the outside, state directive information for indicating that the second access processing is being carried out.

5. (currently amended) The non-volatile storage device of claim 1, wherein said directive of the second access processing is given in accordance with an access command which is one of, and has, as the access command, a first access command for giving a directive to read data from the corresponding buffer unit and to write the data to the at least one non-volatile memory unit, a second access command for giving a directive to read the data from the at least one non-volatile memory unit and to write the data to the corresponding buffer unit, or a third access command for

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giving a directive to erase ~~the~~ data of the <u>at least one</u> non-volatile memory unit.

6. (currently amended) The non-volatile storage device of claim 1, wherein the control unit can recognize an address command supplied from the outside, and

the control unit recognizes a specification of a storage region of <u>one of</u> the buffer ~~unit~~ <u>units</u> and a storage region of <u>one of</u> the non-volatile memory ~~unit~~ <u>units</u> in accordance with <u>the</u>~~an~~ address command.

7. (currently amended) The non-volatile storage device of claim 6, wherein said control unit recognizes a specification of one or a plurality of the buffer units in accordance with the ~~at least one~~ address command, and gives an access to one or a plurality of the non-volatile memory units corresponding to one or a plurality of the buffer units specified in accordance with the address command through the second access processing.

8. (currently amended) The non-volatile storage device of claim 6, wherein the address command has first specification information, second specification information and third specification information,

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the first specification information specifying a non-volatile memory unit and tacitly specifying a buffer unit corresponding to the non-volatile memory unit thus specified,

the second specification information specifying an accessing object address in the specified non-volatile memory unit which is specified, and

the third specification information specifying an accessing object address of the specified buffer unit which is specified.

9. (currently amended) The non-volatile storage device of claim 8, wherein the control unit regards a specification of the buffer unit based on the first specification information as a specification of another buffer unit which does not correspond to the specified non-volatile memory unit when responding to a specific directive of the second access processing.

10. (currently amended) The non-volatile storage device of claim 1, wherein the control unit can carry out the second access processing of the at least one non-volatile memory unit and the first access processing of another buffer unit which does not correspond to the at least one non-volatile memory unit at the same time.

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11. (currently amended) The non-volatile storage device of claim 1, wherein the control unit can carry out an erase processing of the at least one non-volatile memory unit and the first access processing of the one buffer unit at the same time.

12. (currently amended) The non-volatile storage device of claim 1, wherein the control unit maintains storage information of the buffer unit units in such a state as to carry out a processing of responding to a directive of the second access processing of reading data from the corresponding buffer unit and writing the data to the non-volatile memory unit and to then wait for another directive of the first access processing or the second access processing.

13. (currently amended) The non-volatile storage device of claim 1, wherein the control unit maintains storage information of the buffer unit units in such a state as to carry out a processing of responding to a directive of the first access processing of reading data from the one buffer unit and outputting the data to thean outside and to then wait for another directive of the first access processing or the second access processing.

14. (currently amended) The non-volatile storage device of claim 11, wherein the control unit initializes storage

information ~~of a~~ corresponding to one of the buffer ~~memory unit~~ units in accordance with a buffer clear command.

15. (currently amended) The non-volatile storage device of claim 12, wherein the control unit initializes storage information ~~of~~ corresponding to the one buffer unit before writing data input from the outside to the one buffer unit in response to the first access processing when writing that~~the same~~ data.

16. (currently amended) The non-volatile storage device of claim 1, wherein the control unit can transfer data read from the at least one non-volatile memory unit and written to the corresponding buffer unit through the second access processing at plural times in a different timing from ~~the~~ data transfer from that buffer unit to the outside through the first access processing to be carried out at plural times.

17. (currently amended) The non-volatile storage device of claim 1, wherein the control unit omits a second access processing of writing data from the at least one non-volatile memory unit to the corresponding buffer unit which sets the same address as that on the at least one non-volatile memory unit of data retained in the corresponding buffer unit to be an access processing object when a directive of the second access processing is given.

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18. (currently amended) The non-volatile storage device of claim 17, further comprising address holding means for holding address information about an address on the at least one non-volatile memory unit of the data retained in the corresponding buffer unit, and comparing means for comparing the address information held in the address holding means with address information about an address of the at least one non-volatile memory unit which is set to be a data reading object in the second access processing.

19. (currently amended) The non-volatile storage device of claim 17, wherein the control unit varies a period of a busy state ~~based on a signal indicating, as the busy state, that the second access processing is being carried out~~ depending on ~~presence of the~~ omission of the second access processing when a directive for outputting data ~~written from the non-volatile memory unit to the buffer unit in the second access processing~~ from the one buffer unit to the outside is given through the first access processing.

20. (currently amended) The non-volatile storage device of claim 1, wherein the control unit can write data, written from the outside to the one buffer unit by the first access processing at plural times, from ~~the~~the one corresponding buffer unit to the corresponding non-volatile memory unit

through the second access processing carried out at plural times.

21. (currently amended) The non-volatile storage device of claim 1, wherein the control unit can write data, rewritten from the outside ~~onto~~ to the one buffer unit by the first access processing carried out at plural times, from the one buffer unit to the corresponding non-volatile memory unit through the second access processing.

22. (currently amended) The non-volatile storage device of claim 1, wherein ~~the~~ each non-volatile memory unit can store multivalued information of 2 bits or more in one storage element and ~~the~~ each buffer unit can store binary information of 1 bit in one storage element.

23. (currently amended) The non-volatile storage device of claim 22, wherein the control unit can regard storage information of one or more of the non-volatile memory units~~unit~~ as binary information and can control a third access processing of omitting a converting operation from a multivalue to a binary.

24. (currently amended) The non-volatile storage device of claim 5, further comprising, on a signal path to be used for the first access processing, an address buffer for

latching address information sent from the outside, a buffer
unit address buffer for inputting an output of the address
buffer and supplying the output to the one buffer unit, a
buffer unit data buffer for latching data output from the one
buffer unit, and a data buffer for latching data output from
the buffer unit data buffer and outputting the data to the
outside,

the control unit generating, as a dummy clock, a latch
timing of the buffer unit address buffer and a latch timing of
the buffer unit data buffer while an address command is
recognized synchronously with a first strobe signal and a
second strobe signal, for giving a directive to read data to
the outside in the first access processing, is then changed.

25. (currently amended) The non-volatile storage device
of claim 1, wherein the non-volatile memory unit has an erase
unit which is plural times as large as a write unit and each
of the buffer units has a storage capacity on of the write
unit, and

the control unit uses both the corresponding buffer unit
of a bank to be a rewrite object and the corresponding buffer
unit of a different bank, in a save region of rewrite object
storage information corresponding to a directive of a rewrite
operation, for storage information on of the erase unit.

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26. (original) The non-volatile storage device of claim 1, wherein said non-volatile storage device is formed on one semiconductor chip.

27. (currently amended) The non-volatile storage device of claim 1, further comprising another circuit module and~~is~~ wholly formed on one semiconductor chip.

28. (currently amended) A non-volatile storage device comprising:

a plurality of memory banks; and

a control unit,

each~~the~~ memory bank having a non-volatile memory unit and a buffer unit corresponding thereto,

~~accessing~~ access to object regions of the buffer unit and the non-volatile memory unit being specified based on an address command, ~~and~~

the control unit being adapted to~~capable of controlling~~ control, separately from each other, a first access processing ~~of carrying out an access~~ operation between an outside of the non-volatile storage device and one of the buffer units~~unit~~ and a second access processing ~~of carrying out an access~~ operation between ~~the~~ at least one non-volatile memory unit and the corresponding buffer unit, based upon receipt of directives from the outside, and ~~separately from each other,~~ ~~and~~

the control unit further being adapted for controlling

one ~~of the~~ first access processing in correspondence

with~~corresponding to one of the~~ second access processing, and

for controlling a plurality of ~~the~~ first access processings in

correspondence with~~corresponding to~~ one ~~of the~~ second access

processing.

29. (currently amended) The non-volatile storage device

of claim 28, wherein the control unit ~~is caused to utilize~~

utilizes the buffer unit corresponding to ~~of~~ the memory bank

specified in accordance with the address command in the first

access processing, and ~~is caused to utilize~~utilizes the same

buffer unit ~~of the memory bank specified in accordance with~~

~~the address command~~ or the corresponding buffer unit of

another memory bank according~~corresponding~~ to contents of a

directive in the second access processing.

30. (currently amended) The non-volatile storage device

of claim 28, wherein the control unit controls a read set-up

operation for an~~the~~ accessing object region of the non-

volatile memory unit specified in accordance with an address

command every time the address command is input within a limit

based~~of the number of times of a dependence~~ on the number of

~~the~~ memory banks, and controls to read storage information

from the non-volatile memory unit subjected to the read set-up

and to write the storage information to the corresponding

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buffer unit when a read access command for giving a directive of a read operation as the second access processing is input.

31. (currently amended) The non-volatile storage device of claim 28, wherein the control unit controls a write operation for writing~~write~~ data to a corresponding ~~the~~ buffer unit of a ~~the~~ memory bank specified in accordance with an address command every time the address command is input and the ~~write~~ data are input in accordance with a directive of the first access processing continuously within a limit ~~of the number of times of a dependence~~based on the number of ~~the~~ memory banks, and carries out a control to write the ~~write~~ data possessed by the corresponding buffer unit to the non-volatile memory unit of the specified~~corresponding~~ memory bank when a write access command ~~for~~ giving a directive of the write operation as the second access processing is input.

32. (currently amended) The non-volatile storage device of claim 28, wherein the control unit controls an erase operation of a storage region for a corresponding~~the~~ non-volatile memory unit of a~~the~~ memory bank specified in accordance with an address command by inputting the address command and then inputting an erase command continuously within a limit ~~of the number of times of a dependence~~based on the number of ~~the~~ memory banks.

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33. (currently amended) A non-volatile storage device comprising:

a control unit;

a non-volatile storage unit; and

a buffer circuit,

the non-volatile storage unit being divided into a plurality of non-volatile storage regions,

the buffer circuit being divided into a plurality of buffer regions each corresponding to one of the non-volatile storage regions,

the control unit accepting a plurality of operation directive commands from an outside of the non-volatile storage device, the operation directive commands having:

a first operation directive command for giving a directive of an access operation between the buffer circuit and the outside; and

a second operation directive command for giving a directive of an access operation between the buffer circuit and the non-volatile storage unit,

the first operation directive command being for performinggiving a directive of an access operation to one or a plurality of the buffer regionsregion, and

the second operation directive command being for performingcapable of selecting either an access operation to one or a plurality of the non-volatile storage regionsregion or an access operation to the non-volatile storage regions.

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34. (currently amended)   The non-volatile storage device of claim 33, wherein the control unit has a command accepting state for~~capable of~~ accepting any of the operation directive commands~~command~~, and accepts an arbitrary one of the operation directive commands~~command~~ to carry out ~~a~~ processing corresponding to the accepted one~~each~~ operation directive command ~~and then brings the command accepting state~~.

35. (currently amended)   The non-volatile storage device of claim 34, wherein the operation directive commands further have~~command is~~ a third operation directive command for specifying an address to select one of the non-volatile storage ~~region~~ regions, and

the second operation directive command gives a directive to carry out an access operation between one of the non-volatile storage ~~region~~ regions, which is selected in accordance with the third operation directive command, and the buffer circuit.

36. (currently amended)   The non-volatile storage device of claim 35, wherein the control unit selects one of the non-volatile storage ~~region~~ regions in accordance with the third operation directive command and also selects one of the buffer ~~region~~ regions corresponding to the selected non-volatile storage region ~~thus selected~~,

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the first operation directive command gives a directive
for carrying out an access operation between the one buffer
region selected in accordance with the third operation
directive command and the outside, and

the second operation directive command gives a directive
for carrying out an access operation between the one buffer
region and the one non-volatile storage region, which are
selected in accordance with the third operation directive
command.

37. (currently amended) The non-volatile storage device
of claim 36, wherein the control unit is brought into the
command accepting state corresponding to a completion of a
part of the access processing to ~~the~~a non-volatile storage
region specified by~~in accordance with~~ the second operation
directive command, and

before all the access processings to the one non-volatile
storage region are completed, can perform~~carry out~~

an acceptance of the third operation directive command,
and

an acceptance of the first or second operation directive
command when the one buffer region and the one non-volatile
storage region which are selected in accordance with the third
operation directive command are different from the non-
volatile storage region in which the access processing is
carried out.

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38. (original) The non-volatile storage device of claim 37, wherein the first operation directive command includes a first write operation command for giving a directive to write data to the buffer circuit and a first read operation command for giving a directive to read data from the buffer circuit, and

the second operation directive command includes a second write operation command for giving a directive to write data from the buffer circuit to the non-volatile storage unit and a second read operation command for giving a directive to read data from the non-volatile storage unit to the buffer circuit.

39. (original) The non-volatile storage device of claim 38, wherein the first operation directive command further includes a first erase operation command for giving a directive to erase data written to the buffer circuit, and the second operation directive command further includes a second erase operation command for giving a directive to erase data written to the non-volatile storage unit.

40. (currently amended) The non-volatile storage device of claim 39, wherein after accepting the third operation directive command ~~for~~ specifying a first non-volatile storage region of the non-volatile storage unit and then accepting the second erase operation command, and starting to erase data

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written to the first non-volatile storage region and before

completing ~~the erase~~ erasure of the data,

the control unit can accept another~~the~~ third operation

directive command ~~for~~ specifying a second non-volatile storage

region of the non-volatile storage unit and the first

operation directive command or the second operation directive

command.

41. (currently amended) The non-volatile storage device

of claim 39, wherein after accepting the third operation

directive command ~~for~~ specifying a first non-volatile storage

region of the non-volatile storage unit and then accepting the

second read command, and completing to read data from the non-

volatile storage unit to the buffer circuit,

the control unit can accept the first operation directive

command at least once, and furthermore, can carry out an

operation for accepting the second write command.

42. (currently amended) The non-volatile storage device

of claim 41, wherein after accepting the second read command

and before accepting the second write command,

the control unit carries out an acceptance of the other

third operation directive command ~~for~~ specifying a second non-

volatile storage region of the non-volatile storage unit and

an acceptance of the first operation directive command or the

second operation directive command at least once and can then

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carry out an operation for accepting the third operation directive command ~~for~~ specifying the first non-volatile storage region.

43. (original) The non-volatile storage device of claim 38, wherein the control unit can carry out an operation for accepting the second write command after accepting the third operation directive command for specifying the first non-volatile storage region of the non-volatile storage unit and then accepting the first write command at least once.

44. (original) The non-volatile storage device of claim 43, wherein the control unit can carry out an operation for accepting the first operation directive command at least once after accepting the first write command at least once.

45. (original) The non-volatile storage device of claim 43, wherein the control unit can carry out the operation for accepting the second write command at least once after accepting the write command at least once.

46. (currently amended) The non-volatile storage device of claim 39, wherein the control unit accepts the second read command after accepting the third operation directive command for specifying a first address included in the first non-volatile storage region of the non-volatile storage unit,

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reads data in a first data volume from an address
specified in accordance with the third operation directive
command from the non-volatile storage unit to the buffer
circuit in accordance with the second read command, and

can then accept, at least once, the third operation
directive command and the first operation directive command
which specify an address included in the first non-volatile
storage region of the non-volatile storage unit and contained
within~~in~~ a range of addresses of~~~~ the first data volume ~~from
the first address~~.

47. (currently amended) The non-volatile storage device
of claim 39, wherein when accepting the second read command
after accepting the third operation directive command for
specifying a first address included in the first non-volatile
storage region of the non-volatile storage unit,

reading data in a first data volume from an address
specified in accordance with the third operation directive
command from the non-volatile storage unit to the buffer
circuit in accordance with the second read command, and

further accepting the third operation directive command
for specifying a second address included in the first non-
volatile storage region of the non-volatile storage unit and
contained within~~in~~ a range of addresses of~~~~ the first data
volume from the first address, and accepting the second read
command,

the control unit does not carry out a read operation from the non-volatile storage unit to the buffer circuit in a processing of the second read command.

48. (original) The non-volatile storage device of claim 39, wherein the control unit does not erase data written to the buffer circuit in a completion of the second write command but erases the data written to the buffer circuit in accordance with the first erase operation command.

49. (currently amended) The non-volatile storage device of claim 35, further comprising a first buffer region of the ~~a~~ buffer circuit which preferentially corresponds to a first non-volatile storage region and the~~a~~ second buffer region of a buffer circuit which preferentially corresponds to a second non-volatile storage region,

the~~a~~ first buffer region ~~of the buffer circuit~~ being adapted to carry~~capable of carrying~~ out an access operation together with the second non-volatile storage region, and

the~~a~~ second buffer region ~~of the buffer circuit~~ being adapted to carry~~capable of carrying~~ out an access operation together with the first non-volatile storage region.

50. (currently amended) The non-volatile storage device of claim 49, wherein the first operation directive command includes a first write operation command for carrying out an

access operation between the first buffer region ~~of the buffer~~

~~circuit~~ and the outside to give a directive to write data to

the buffer circuit, a first read operation command for giving

a directive to read data from the buffer circuit, and a first

erase operation command for giving a directive to erase data

written to the buffer circuit, and

the second operation directive command includes a second

write operation command for carrying out an access operation

between a~~the~~ buffer region of the buffer circuit selected in

accordance with the third operation directive command and ~~the~~

~~non-volatile storage region of~~ the non-volatile storage unit

to give a directive to write data from the buffer circuit to

the non-volatile storage unit, a second read operation command

for giving a directive to read data from the non-volatile

storage unit to the buffer circuit, and a second erase

operation command for giving a directive to erase data written

to the non-volatile storage unit,

the second write operation command having a main second

write operation command for giving a directive to write data

to the non-volatile storage region which preferentially

corresponds to the buffer region of the buffer circuit which

is selected, and a subordinate second write operation command

for giving a directive to write data to a non-volatile storage

region which is not the non-volatile storage region

preferentially corresponding to the buffer region of the

buffer circuit which is selected, and

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the second read operation command having a main second read operation command for giving a directive to read data from the non-volatile storage region which preferentially corresponds to the buffer region of the buffer circuit which is selected, and a subordinate second read operation command for giving a directive to read data from a non-volatile storage region which is not the non-volatile storage region preferentially corresponding to the buffer region of the buffer circuit which is selected.

51. (currently amended) The non-volatile storage device of claim 50, wherein data are read or written at a time on a first data volume unit in accordance with the second read command or the second write command,

data are erased at a time on a unit of a second data volume which is larger than the first data volume in accordance with the second erase command, and

when a first address is specified in accordance with the third operation directive command and a directive of the second erase command is given, first data included in an address range of~~having~~ the first data volume from the first ~~address~~ are written to the non-volatile storage region preferentially corresponding to the buffer region of the buffer circuit which is selected and/or~~/ and~~ second data sent from a second address which is not included in the address range of~~having~~ the first data volume ~~from the first address~~

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are written to the non-volatile storage region which is not

the non-volatile storage region preferentially corresponding

to the buffer region of the buffer circuit which is selected.

52. (currently amended) A non-volatile storage device

comprising:

a control unit; and

a non-volatile storage unit~~,~~,

the non-volatile storage unit having a plurality of

storage regions, and

a~~the~~ plurality~~same number~~ of buffer circuits each

corresponding to one of the ~~as the number of the~~ storage

regions,

the buffer circuits being connected to an outside of the

non-volatile storage device, ~~and being caused correspond to~~

~~the storage regions, respectively,~~

the buffer circuits being adapted to access~~capable of~~

~~being accessed to~~ the outside independently based on a control

to be carried out by the control unit, ~~respectively,~~ and

at least one ~~or a plurality~~ of the storage regions being

adapted to carry~~capable of carrying~~ out an access operation

independently ~~together~~ with the corresponding buffer circuit

based on the control to be carried out by the control unit.

53. (currently amended) A non-volatile storage device

comprising:

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a non-volatile memory unit;

a buffer unit; and

a control unit,

the non-volatile memory unit being divided into a plurality of memory banks each of which can independently carry out an access operation, ~~respectively,~~

the buffer unit being divided into a plurality of regions corresponding to the respective memory banks, and

the control unit being adapted to~~capable of~~ independently carry~~carrying~~ out an access control in accordance with a directive given from an outside of the non-volatile storage device with respect to the non-volatile memory unit and the buffer unit, and giving an access directive to one or a plurality of the regions of the buffer unit in accordance with the directive given from the outside and then carrying out an access control between the non-volatile memory unit and the buffer unit with respect to one or a plurality of the memory banks corresponding to one or a plurality of the regions.

54. (currently amended) A non-volatile storage device comprising:

a non-volatile memory unit;

a buffer unit; and

a control unit,

the control unit being adapted to control, independently of each other,~~capable of controlling~~ a first access processing

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between an outside of the non-volatile storage device and the

buffer unit, a second access processing between the non-

volatile memory unit and the buffer unit, and an

initialization processing of the buffer unit upon receipt of

directives from the outside ~~separately from each other~~, and

    carrying out no initialization ~~over~~ on the buffer unit

depending on a completion of the first access processing and

the second access processing but bringing the buffer unit into

an initialized~~initializing~~ state depending on the

initialization processing of the buffer unit.

    55. (currently amended) The non-volatile storage device

of claim 54, wherein the non-volatile memory unit has a

plurality of non-volatile memory cells, each of the non-

volatile memory cells having a first state indicative of an

erase state and a second state indicative of a write state,

and

    wherein the initialized~~initializing~~ state of the buffer

unit corresponds to the first state of the non-volatile memory

~~cell~~ cells.

    56. (currently amended) The non-volatile storage device

of claim 55, wherein ~~the~~ each non-volatile memory cell has a

threshold voltage, and the state of each ~~of the~~ non-volatile

memory ~~cells~~ cell is determined depending on whether a

threshold voltage of ~~the~~ that non-volatile memory cell is

included in an erase voltage distribution indicative of the erase state or a write voltage distribution indicative of the write state.

57. (original) The non-volatile storage device of claim 56, wherein the second access processing includes a data read operation from the non-volatile memory unit to the buffer unit,

the first access processing includes a data output operation from the buffer unit to the outside, and

the data output operation can be carried out at plural times after one data read operation.

58. (original) The non-volatile storage device of claim 57, wherein the control unit carries out the initialization processing of the buffer unit before the data read operation.

59. (original) The non-volatile storage device of claim 56, wherein the second access processing includes a data write operation from the buffer unit to the non-volatile memory unit,

the first access processing includes a data input operation from the outside to the buffer unit, and

one data write operation can be carried out after the data input operation executed at plural times.

60. (original) The non-volatile storage device of claim 59, wherein the control unit carries out the initialization processing of the buffer unit after the data write.